

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE For use of this form, see ER 415-1-0; the proponent agency is CECW-CE						DATE <div style="text-align: center;">10/20/2017</div>		TRANSMITTAL NO. <div style="text-align: center;">01 35 45.00 10-7</div>	
SECTION I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)									
TO: Eastern Environmental Project Office USAED Seattle 1910 Northwest Boulevard, Suite 210 Coeur d'Alene, ID 83814			FROM: Amec Foster Wheeler Environment & Infra 751 Arbor Way, Ste 180 Blue Bell PA19422-1972			CONTRACT NO. <div style="text-align: center;">W912DW-16-C-0012</div>		THIS IS A: <div style="text-align: center;">NEW TRANSMITTAL</div>	
SPECIFICATION SEC. NO. (Cover only one section with each transmittal) 01 35 45.00 10-Chemical Data Quality Control			PROJECT TITLE AND LOCATION 01 CTP Upgrade and Ground Water Collection, Bunker Hill Superfund Site, Kellogg, ID				THIS TRANSMITTAL IS FOR: (Check one) <input checked="" type="checkbox"/> FIO <input type="checkbox"/> GA <input type="checkbox"/> DA <input type="checkbox"/> CR <input type="checkbox"/> DA/CR <input type="checkbox"/> DA/GA <input type="checkbox"/> S		
ITEM NO. (See Note 3) a.	DESCRIPTION OF SUBMITTAL ITEM (Type size, model number/etc) b.	SUBMITTAL TYPE CODE (See Note 8) c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">SPEC. PARA NO. e.</div> <div style="width: 45%;">DRAWING SHEET NO. f.</div> </div>		FOR CONTRACTOR USE g.	VARIATION (See Instruction No. 6) h.	FOR CE USE CODE (Note 9) i.	
4.4	DMR September 2017	06 - TEST REPORTS	0	3.7		A	No		
Remarks from Contractor									
(Area for contractor's stamp or seal)						I certify that the above submitted items have been reviewed in detail and are correct and in the strict conformance with the contract drawings and specifications except as otherwise stated. <div style="text-align: center;"> NAME AND SIGNATURE OF CONTRACTOR </div>			
SECTION II - APPROVAL ACTION									
ENCLOSURES RETURNED (List by item No.)			NAME, TITLE AND SIGNATURE OF APPROVING AUTHORITY					DATE	



AMEC FOSTER WHEELER
BUNKER HILL CENTRAL TREATMENT PLANT UPGRADE PROJECT
Kellogg, Idaho

TRANSMITTAL FORM: DMR September 2017

☒ Approved

☐ Approved with corrections as noted on submittal data and/or attached sheet(s)

Signature: 

By: Spencer Archer, PE

Title: Commissioning and O&M Manager

Date: October 20, 2017

☒ Approved

☐ Approved with corrections as noted on submittal data and/or attached sheet(s)

Signature: 

By: Patrick Hope

Title: CQCSM

Date: October 20, 2017

Distribution: USACE, Seattle District
Amec Foster Wheeler



DATA VALIDATION REPORT

Bunker Hill Central Treatment Plant

Kellogg, Idaho

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.

7376 SW Durham Road
Portland, Oregon 97224
(503) 639-3400

October 2017

Project No. 6519170001.C0801H.01

TABLE OF CONTENTS

	Page
ACRONYMS	iii
1.0 INTRODUCTION	1
2.0 DATA VALIDATION METHODOLOGY	1
3.0 EXPLANATION OF DATA QUALITY INDICATORS	2
3.1 Laboratory Control Sample Recoveries	2
3.2 Matrix Spike Recoveries.....	3
3.3 Blank Concentrations	3
3.4 Laboratory Duplicates	4
4.0 DEFINITIONS OF QUALIFIERS THAT MAY BE ADDED DURING DATA VALIDATION	4
5.0 QUALIFICATION REASON CODES.....	4
6.0 CHAIN OF CUSTODY AND SAMPLE RECEIPT CONDITION DOCUMENTATION	4
7.0 SPECIFIC DATA VALIDATION FINDINGS.....	5
7.1 Metals By EPA Method 200.7.....	5
7.1.1 Holding Times	5
7.1.2 Initial and Continuing Calibration Verification.....	5
7.1.3 Initial and Continuing Calibration Blanks.....	5
7.1.4 Laboratory, Equipment, and Trip Blanks.....	6
7.1.5 Laboratory Control Sample Accuracy and Precision	6
7.1.6 Laboratory Duplicates.....	6
7.1.7 Matrix Spikes/Matrix Spike Duplicates	6
7.1.8 Analytical Sensitivity	8
7.1.9 Data Reporting and Analytical Procedures	8
7.2 Total Suspended Solids by SM 2540D	8
7.2.1 Holding Times	8
7.2.2 Laboratory Blanks.....	8
7.2.3 Laboratory Control Sample Accuracy and Precision	9
7.2.4 Laboratory Duplicates.....	9
7.2.5 Analytical sensitivity.....	9
7.2.6 Data Reporting and Analytical Procedures	9
7.3 pH by SM 4500B	9
7.3.1 Holding Times	9
7.3.2 Laboratory Control Sample Accuracy	9
7.3.3 Laboratory Duplicates.....	10
7.3.4 Data Reporting and Analytical Procedures	10
8.0 FIELD DUPLICATES	10
9.0 SUMMARY AND CONCLUSIONS.....	10
REFERENCES.....	11
LIMITATIONS.....	12

TABLES

Table 1	Field Samples Submitted to SVL Analytical, Inc.
Table 2	Qualifiers Added During Data Validation
Table 3	Field Duplicate Detections

ACRONYMS

%	percent
°C	degrees Celsius
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
CLP	Contract Laboratory Program
COC	chain of custody
CCV	continuing calibration verification
EPA	United States Environmental Protection Agency
ICAL	initial calibration
ICV	initial calibration verification
ID	identification
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDL	method detection limit
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
QC	quality control
RL	reporting limit
RPD	relative percent difference
SAP	sampling and analysis plan
SM	Standard Method
SVL	SVL Analytical Inc.
TSS	total suspended solids

DATA VALIDATION REPORT

Bunker Hill Central Treatment Plant

Kellogg, Idaho

1.0 INTRODUCTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) collected 37 water samples (including four field duplicates, one equipment blank, and one trip blank) between August 14 and September 29, 2017 from the Bunker Hill Central Treatment Plant in Kellogg, Idaho. Amec Foster Wheeler submitted the samples to SVL Analytical Inc. (SVL), located in Coeur D'Alene, Idaho, where they were assigned to sample delivery groups X7H0319, X7G0481, X7H0647, X7H0696, X7I0001, X7I0044, X7I0045, X7I0070, X7I0164, X7I0210, X7I0211, X7I0288, X7I0371, X7I0372, X7I0406, X7I0407, X7I0454, X7I0540, X7I0561, X7I0608, and X7I0701. SVL analyzed the samples for total metals by United States Environmental Protection Agency (EPA) Method 200.7, total suspended solids (TSS) by Standard Methods (SM) for the Examination of Water and Wastewater 2540D; and pH by SM 4500B. A list of these samples by field sample identification (ID), sample collection date, and the laboratory sample IDs is presented in Table 1.

2.0 DATA VALIDATION METHODOLOGY

Amec Foster Wheeler performed Stage 4 validation on samples KT-08-14-17, KT-08-17-17, PTM-08-17-17 and QC-08-17-17. The Stage 4 validation includes review and recalculation of the laboratory's analytical report and the raw analytical data. The remainder of the data underwent EPA Stage 2B validation, which includes review of sample- and instrument-specific quality control (QC) samples on data summary forms, but does not include review or validation of the raw analytical data. This data validation has been performed in general accordance with:

- Amec Foster Wheeler, 2017. Operations & Maintenance Services Sampling and Analysis Plan (SAP), Bunker Hill Central Treatment Plant Upgrade Project, Kellogg, Idaho, March 2017.
- EPA, 2014. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Superfund Data Review, EPA-540 R 013 001.
- The analytical methods referenced by the laboratory.

The laboratory's certified analytical report and supporting documentation were reviewed to assess the following:

- Data package and electronic data deliverable completeness;
- Chain-of-custody (COC) compliance;
- Sample Receipt
- Holding time compliance;
- Initial calibration (ICAL), initial calibration verification (ICV), and continuing calibration verification (CCV) compliance with method specified criteria;
- Presence or absence of laboratory contamination as demonstrated by calibration and laboratory blanks;
- Accuracy and bias as demonstrated by recovery of surrogate spikes, laboratory control sample (LCS), and matrix spike (MS) samples;
- Analytical precision as relative percent difference (RPD) of analyte concentration between laboratory duplicates, LCSs/LCS duplicates (LCSDs), or MS/MS duplicates (MSDs);
- Sampling and analytical precision as RPD of analyte concentration between field duplicates;
- Internal standard and surrogate compound recoveries;
- Analyte identification and quantification verification from raw analytical data (Stage 4 validation only); and
- Insofar as possible, the degree of conformance to method requirements and good laboratory practices

3.0 EXPLANATION OF DATA QUALITY INDICATORS

Summary explanations of the specific data quality indicators reviewed during data validation are presented below.

3.1 LABORATORY CONTROL SAMPLE RECOVERIES

LCSs are aliquots of analyte free matrices that are spiked with the analytes of interest for an analytical method, or a representative subset of those analytes. The spiked matrix is then processed through the same analytical procedures as the samples they accompany. LCS recovery is an indication of a laboratory's ability to successfully perform an analytical method in an interference free matrix.

3.2 MATRIX SPIKE RECOVERIES

MSs and MSDs are prepared by adding known amounts of the analytes of interest for an analytical method, or a representative subset of those analytes, to an aliquot of sample. The spiked sample is then processed through the same extraction, concentration, cleanup, and analytical procedures as the unspiked samples in an analytical batch.

MS recovery and precision are an indication of a laboratory's ability to successfully recover an analyte in the matrix of a specific sample or closely related sample matrices. It is important not to apply MS results for any specific sample to other samples without understanding how the sample matrices are related.

3.3 BLANK CONCENTRATIONS

Blank samples are aliquots of analyte free matrix that are used as negative controls to verify that the sample collection, storage, preparation, and analysis system does not produce false positive results.

Laboratory blanks are processed by the laboratory using exactly the same procedures as the field samples. Target analytes should not be found in laboratory blanks.

Equipment blanks are prepared by passing analyte-free water through or over sample collection equipment and collecting the water in sample containers. Equipment blanks are analyzed for the analytical suite required for the project. Equipment blanks are used to monitor for possible sample contamination during the sample collection process and serve as a check on the effectiveness of field decontamination procedures.

Trip blanks are vials of analyte free water that accompany sample bottles shipped to the field and back to the laboratory with field samples. Trip blanks assess contamination attributed to shipping and handling procedures, as well as contamination from containers. Target analytes should not be found in trip blanks.

Target analytes should not be found in laboratory, equipment, and trip blanks. When target analytes are detected in blanks, analyte concentrations in associated samples less than five times the concentration detected in the blank will be U qualified as being not detected.

3.4 LABORATORY DUPLICATES

Laboratory duplicate analysis verifies acceptable method precision by the laboratory at the time of preparation and analysis and/or sampling precision at the time of collection.

4.0 DEFINITIONS OF QUALIFIERS THAT MAY BE ADDED DURING DATA VALIDATION

- J** The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- R** The sample result is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
- U** The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
- UJ** The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

5.0 QUALIFICATION REASON CODES

The following reason codes were applied to the data during data validation:

- DL** The analyte concentration is between the method detection limit (MDL) and the reporting limit (RL).
- HD** High laboratory duplicate RPD
- HT** Holding time exceeded.
- MB** Method blank detection.

6.0 CHAIN OF CUSTODY AND SAMPLE RECEIPT CONDITION DOCUMENTATION

The samples were received at the laboratory under proper COC, intact, properly preserved, and at temperatures less than the SAP-specified maximum of 6 degrees Celsius (°C).

7.0 SPECIF-IC DATA VALIDATION FINDINGS

Results from these samples may be considered usable with the limitations and exceptions described in Sections 7.1 through 8.0. Qualifiers added during validation are summarized in Table 2.

7.1 METALS BY EPA METHOD 200.7

Total metals results generated by SVL may be considered usable with the limitations described in Sections 7.1.1 through 7.1.9.

7.1.1 Holding Times

All samples were analyzed for metals within the SAP-specified holding of 180 days

7.1.2 Initial and Continuing Calibration Verification

ICV and CCV recoveries were within method-specified limits, with the following exception:

- Manganese recovery was high at 131% in the low-level ICV associated with the analysis of sample 006-09-11-17. Manganese was detected in the associated sample at a concentration more than five times the low-level ICV, and data usability is not adversely affected by the potential high analytical bias.

7.1.3 Initial and Continuing Calibration Blanks

Target analytes were not detected in the initial calibration blanks and continuing calibration blanks, with the following exceptions:

- Cadmium was detected at concentrations of 0.0010 milligrams per liter (mg/L) in the calibration blanks associated with sample 006-09-06-17. Amec Foster Wheeler U qualified the detected cadmium result from sample 006-09-06-17 because of the blank detection. (U-MB)
- Cadmium was detected at concentrations of 0.0009 mg/L and 0.0008 mg/L, respectively, in the calibration blanks associated with sample 006-09-20-17. Amec Foster Wheeler U qualified the detected cadmium result from sample 006-09-20-17 because of the blank detection. (U-MB)
- Cadmium was detected at a concentration of 0.0009 mg/L in the calibration blank associated with samples 006-09-22-17 and QC-09-22-17. Amec Foster Wheeler U qualified the detected cadmium results from samples 006-09-22-17 and QC-09-22-17 because of the blank detection. (U-MB)

- Cadmium was detected at a concentration of 0.0008 mg/L in the calibration blank associated with samples KT-09-11-17, QC-09-11-17, and KT-09-14-17. Cadmium was detected in the associated samples at concentrations greater than five times the concentration detected in the blank, and data usability is not adversely affected by the blank detection.
- Zinc was detected at a concentration of 0.003 mg/L in the calibration blank associated with sample 006-09-08-17. Zinc was detected in the associated sample at a concentration greater than five times the concentration detected in the blank, and data usability is not adversely affected by the blank detection.

7.1.4 Laboratory, Equipment, and Trip Blanks

Target analytes were not detected in the laboratory, equipment, and trip blanks associated with the analysis of these samples, with the following exception:

- Cadmium was detected at a concentration of 0.0004 mg/L in the trip blank associated with samples KT-09-11-17 and QC-09-11-17. Cadmium was detected in the associated samples at concentrations greater than five times the concentration detected in the blank, and data usability is not adversely affected by the blank detection.

7.1.5 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries were within the SAP-specified limits, and RPDs between the LCS and LCSD results were less than the SAP-specified maximum of 20 percent.

7.1.6 Laboratory Duplicates

SVL performed duplicate analyses on project samples QC-08-17-17, KT-08-21-17, 006-08-30-17, 006-09-01-17, 006-09-04-17, 006-09-06-17, KT-08-28-17, 006-09-08-17, 006-09-11-17, 006-09-13-17, 006-09-15-17, 006-09-18-17, 006-09-20-17, 006-09-22-17, 006-09-25-17, 006-09-27-17, PTM-09-21-17 and 006-09-29-17. RPDs between source and duplicate results were less than the SAP-specified maximum of 20%.

7.1.7 Matrix Spikes/Matrix Spike Duplicates

SVL performed MS and MSD analyses on project samples QC-08-17-17, KT-08-21-17, 006-08-30-17, 006-09-01-17, 006-09-04-17, 006-09-06-17, KT-08-28-17, 006-09-08-17, 006-09-11-17, 006-09-13-17, 006-09-15-17, 006-09-18-17, 006-09-20-17, RB-09-11-17, 006-09-22-17, 006-09-25-17, 006-09-27-17, PTM-09-21-17 and 006-09-29-17 for total metals by EPA method 200.7. MS/MSD recoveries were within SAP-specified limits, and RPDs between MS and MSD results were less than the laboratory-specified maximum of 20%, with the following exceptions:

- Zinc recoveries were low at 47.5% and 49.8% in the MS and MSD performed on sample QC-08-17-17. Zinc was detected in the unspiked native sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese (36.7%, 44.3%) and zinc (-9.00%, -13.0%) recoveries were low in the MS and MSD performed on sample KT-08-21-17. Manganese and zinc were detected in the unspiked native sample at concentrations greater than four times the spike concentrations and data usability cannot be evaluated based on the performance of these analytes in this sample.
- Manganese (27.8%, MSD) and zinc (-10.0%, 252%) recoveries were outside the QAPP-specified limits in the MS and/or MSD performed on sample KT-08-28-17. Manganese and zinc were detected in the unspiked native sample at concentrations greater than four times the spike concentrations and data usability cannot be evaluated based on the performance of these analytes in this sample.
- Manganese recovery was low at 69.2% in the MSD performed on sample 006-09-08-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recovery was high at 149% in the MS performed on sample 006-09-11-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recovery was low at 68.1% in the MS performed on sample 006-09-13-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recoveries were high at 168% and 145% in the MS and MSD performed on sample 006-09-15-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recovery was low at 22.7% and 47.3% in the MS and MSD performed on sample 006-09-18-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recoveries were outside the QAPP-specified limits at 152% and 48.8%, respectively, in the MS and MSD performed on sample 006-09-20-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike

concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.

- Manganese recoveries were outside the QAPP-specified limits at 29.4% and 200% in the MS and MSD performed on sample 006-09-22-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recoveries were low at -154% and 185%, respectively, in the MS and MSD performed on sample 006-09-25-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recoveries were low at 38.4% and 63.8%, respectively, in the MS and MSD performed on sample 006-09-27-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.
- Manganese recovery was high at 165% in the MS performed on sample 006-09-29-17. Manganese was detected in the native unspiked sample at a concentration greater than four times the spike concentration and data usability cannot be evaluated based on the performance of this analyte in this sample.

7.1.8 Analytical Sensitivity

Amec Foster Wheeler compared RLs for cadmium, lead, manganese, and zinc against applicable discharge limits to confirm that the RLs were sufficiently low to meet the discharge limits. Non-detect results were reported to RLs less than the applicable discharge limits.

7.1.9 Data Reporting and Analytical Procedures

SVL J qualified analytes with concentrations between the MDL and the RL. Amec Foster Wheeler agrees that these results are quantitatively uncertain and has maintained SVL's J qualifiers. (J-DL)

7.2 TOTAL SUSPENDED SOLIDS BY SM 2540D

TSS results generated by SVL may be considered fully usable without qualification.

7.2.1 Holding Times

All samples were analyzed for TSS within the SAP-specified holding time of 7 days.

7.2.2 Laboratory Blanks

TSS was not detected in the laboratory blanks associated with the analysis of these samples.

7.2.3 Laboratory Control Sample Accuracy and Precision

LCS and LCSD recoveries were within the laboratory-specified 90 to 110% limits and RPDs between the LCS and LCSD results were less than the laboratory-specified maximum of 10%.

7.2.4 Laboratory Duplicates

SVL performed duplicate analyses on project samples KT-08-14-17, KT-08-21-17, 006-08-30-17, 006-09-01-17, 006-09-04-17, 006-09-06-17, KT-08-28-17, 006-09-08-17, 006-09-11-17, 006-09-13-17, 006-09-15-17, 006-09-18-17, 006-09-20-17, KT-09-11-17, 006-09-22-17, 006-09-25-17, 006-09-27-17, KT-09-18-17, and 006-09-29-17. RPDs between source and duplicate results were less than laboratory-specified maximum of 10%, with the following exceptions:

- The RPD for TSS was high at 11.8% in the duplicate analyses of sample 006-09-13-17. The difference between primary and duplicate results was less than the RL, demonstrating acceptable analytical precision, and data were not qualified based on the high RPD.

7.2.5 Analytical sensitivity

Amec Foster Wheeler compared RLs for TSS against applicable discharge limits to confirm that the RLs were sufficiently low to meet the discharge limits. Non-detect results were reported to RLs less than the applicable discharge limits.

7.2.6 Data Reporting and Analytical Procedures

SVL J qualified analytes with concentrations between the MDL and the RL. Amec Foster Wheeler agrees that these results are quantitatively uncertain and has maintained SVL's J qualifiers. (J-DL)

7.3 pH BY SM 4500B

pH results generated by SVL may be considered usable with the limitations described in Sections 7.3.1 through 7.3.4.

7.3.1 Holding Times

All samples were analyzed for pH after the method-specified 15-minute hold time had passed. Amec Foster Wheeler J qualified the pH results from these samples because of the missed hold time. (J-HT)

7.3.2 Laboratory Control Sample Accuracy

LCS recoveries were within the laboratory-specified 98.5 to 101.5% limits.

7.3.3 Laboratory Duplicates

SVL performed duplicate analyses on samples KT-08-14-17, KT-08-21-17, 006-08-30-17, 006-09-01-17, 006-09-04-17, 006-09-06-17, KT-08-28-17, 006-09-08-17, 006-09-11-17, 006-09-13-17, 006-09-15-17, 006-09-18-17, 006-09-20-17, KT-09-11-17, 006-09-22-17, 006-09-25-17, 006-09-27-17, KT-09-18-17, and 006-09-29-17. RPDs between source and duplicate results were less than laboratory-specified maximum of 5%.

7.3.4 Data Reporting and Analytical Procedures

There were no data anomalies associated with the pH analysis of these samples.

8.0 FIELD DUPLICATES

Field duplicates were collected with samples PTM-08-17-17 (QC-08-17-17), KT-08-24-17 (QC-08-24-17), PTM-09-07-17 (QC-09-17-17), and 006-09-22-17 (QC-09-22-17). Target analyte detections are summarized in Table 3. Precision values were less than the QAPP-specified maximum of 30%, or the differences between detected concentrations were less than the RL, demonstrating acceptable sampling and analytical precision.

9.0 SUMMARY AND CONCLUSIONS

Amec Foster Wheeler reviewed 200 data records from field samples during this validation. All the data generated are usable and of acceptable quality with the addition of qualifiers presented in Table 2. Qualifier definitions are summarized in Section 4.0, reason codes are summarized in Section 5.0, and qualified data are summarized below.

- Amec Foster Wheeler U qualified 4 records (2.0%) because of blank detections.
- Amec Foster Wheeler J qualified 55 records (27.5%) as being estimated concentrations because of hold time exceedances, potential analytical imprecision, or analyte concentrations between the MDL and RL.

No records were rejected and 100% of the data should be considered valid with the addition of the qualifiers presented in Table 2.

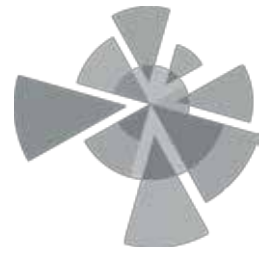
REFERENCES

Amec Foster Wheeler, 2017. Operations & Maintenance Services Sampling and Analysis Plan (SAP), Bunker Hill Central Treatment Plant Upgrade Project, Kellogg, Idaho, March 2017.

EPA, 2016. EPA Contract Laboratory Program (CLP) National Functional Guidelines for Inorganic Superfund Data Review, EPA-540-R-2016-001.

LIMITATIONS

This report was prepared exclusively for the Bunker Hill Central Treatment Plant by Amec Foster Wheeler Environment & Infrastructure, Inc. The quality of information, conclusions, and estimates contained herein is consistent with the level of effort involved in Amec Foster Wheeler services and based on: i) information available at the time of preparation, ii) data supplied by outside sources, and iii) the assumptions, conditions, and qualifications set forth in this report. This data validation report is intended to be used by the Bunker Hill Central Treatment Plant in Kellogg, Idaho only, subject to the terms and conditions of its contract with Amec Foster Wheeler. Any other use of, or reliance on, this report by any third party is at that party's sole risk.



TABLES

TABLE 1
Field Samples Submitted to SVL Analytical, Inc.
Bunker Hill Central Treatment Plant Upgrade Program
Kellogg, Idaho

Field Sample ID	Collection Date	SVL Analytical, Inc. Sample ID	Notes
KT-08-14-17	8/14/2017	X7H0319-01	Stage 4 Validation
KT-08-17-17	8/17/2017	X7H0319-02	Stage 4 Validation
PTM-08-17-17	8/17/2017	X7H0319-03	Stage 4 Validation
QC-08-17-17	8/17/2017	X7H0319-04	Stage 4 Validation, Field Duplicate of PTM-08-17-17
KT-08-21-17	8/21/2017	X7H0481-01	
KT-08-24-17	8/24/2017	X7H0481-02	
QC-08-24-17	8/24/2017	X7H0481-03	Field Duplicate of KT-08-24-17
KT-08-28-17	8/28/2017	X7H0647-01	
KT-08-31-17	8/31/2017	X7H0647-02	
006-08-30-17	8/30/2017	X7H0696-01	
006-09-01-17	9/1/2017	X7I0001-01	
006-09-04-17	9/4/2017	X7I0044-01	
KT-09-04-17	9/4/2017	X7I0045-01	
KT-09-07-17	9/7/2017	X7I0045-02	
PTM-09-07-17	9/7/2017	X7I0045-03	
QC-09-07-17	9/7/2017	X7I0045-04	Field Duplicate of PTM-09-07-17
006-09-06-17	9/6/2017	X7I0070-01	
006-09-08-17	9/8/2017	X7I0164-01	
006-09-11-17	9/11/2017	X7I0210-01	
006-09-13-17	9/13/2017	X7I0288-01	
006-09-15-17	9/15/2017	X7I0371-01	
PP-09-14-17	9/14/2017	X7I0372-01	
006-09-18-17	9/18/2017	X7I0406-01	
006-09-20-17	9/20/2017	X7I0454-01	
KT-09-11-17	9/11/2017	X7I0211-01	
KT-09-14-17	9/14/2017	X7I0211-05	
QC-09-11-17	9/11/2017	X7I0211-02	
RB-09-11-17	9/11/2017	X7I0211-03	Equipment Blank
TB-09-11-17	9/11/2017	X7I0211-04	Trip Blank
006-09-22-17	9/22/2017	X7I0540-01	
QC-09-22-17	9/22/2017	X7I0540-02	Field Duplicate of 006-09-22-17
006-09-25-17	9/25/2017	X7I0561-01	
006-09-27-17	9/27/2017	X7I0608-01	
KT-09-18-17	9/18/2017	X7I0407-01	
KT-09-21-17	9/21/2017	X7I0407-02	
PTM-09-21-17	9/21/2017	X7I0407-03	
006-09-29-17	9/29/2017	X7I0701-01	

Notes:

ID = identification

TABLE 2
Qualifiers Added During Data Validation
Bunker Hill Central Treatment Plant Upgrade Program
Kellogg, Idaho

SampleIDs	Methods	Analytes	Concentrations	Qualifiers and Reason Codes
006-08-30-17	2540D	TSS	0.6 mg/L	J DL
006-08-30-17	4500H	pH	7.15 SU	J HT
006-09-01-17	2540D	TSS	0.4 mg/L	J DL
006-09-01-17	4500H	pH	6.95 SU	J HT
006-09-04-17	2540D	TSS	0.6 mg/L	J DL
006-09-04-17	4500H	pH	7.16 SU	J HT
006-09-06-17	2540D	TSS	0.2 mg/L	J DL
006-09-06-17	4500H	pH	7.15 SU	J HT
006-09-06-17	EPA 200.7	Cadmium	0.0049 mg/L	U MB
006-09-08-17	2540D	TSS	0.4 mg/L	J DL
006-09-08-17	4500H	pH	7.16 SU	J HT
006-09-11-17	2540D	TSS	0.6 mg/L	J DL
006-09-11-17	4500H	pH	6.97 SU	J HT
006-09-11-17	EPA 200.7	Lead	0.0030 mg/L	J DL
006-09-13-17	4500H	pH	7.17 SU	J HT
006-09-15-17	4500H	pH	7.05 SU	J HT
006-09-18-17	2540D	TSS	0.8 mg/L	J DL
006-09-18-17	4500H	pH	7.02 SU	J HT
006-09-18-17	EPA 200.7	Lead	0.0044 mg/L	J DL
006-09-20-17	2540D	TSS	0.6 mg/L	J DL
006-09-20-17	4500H	pH	7.00 SU	J HT
006-09-20-17	EPA 200.7	Cadmium	0.0041 mg/L	U MB
006-09-20-17	EPA 200.7	Lead	0.0037 mg/L	J DL
006-09-22-17	2540D	TSS	0.4 mg/L	J DL
006-09-22-17	4500H	pH	7.02 SU	J HT
006-09-22-17	EPA 200.7	Cadmium	0.0039 mg/L	U MB
006-09-25-17	2540D	TSS	0.6 mg/L	J DL
006-09-25-17	4500H	pH	6.98 SU	J HT
006-09-27-17	4500H	pH	7.02 SU	J HT
006-09-29-17	4500H	pH	7.00 SU	J HT
KT-08-14-17	4500H	pH	3.00 SU	J HT
KT-08-17-17	4500H	pH	3.03 SU	J HT
KT-08-21-17	4500H	pH	2.88 SU	J HT
KT-08-24-17	4500H	pH	2.91 SU	J HT
KT-08-28-17	4500H	pH	2.91 SU	J HT
KT-08-31-17	4500H	pH	2.92 SU	J HT
KT-09-04-17	4500H	pH	2.82 SU	J HT
KT-09-07-17	4500H	pH	3.06 SU	J HT
KT-09-11-17	4500H	pH	3.12 SU	J HT
KT-09-14-17	4500H	pH	3.21 SU	J HT
KT-09-18-17	4500H	pH	3.23 SU	J HT
KT-09-21-17	4500H	pH	3.30 SU	J HT
PTM-08-17-17	2540D	TSS	0.6 mg/L	J DL
PTM-08-17-17	4500H	pH	7.02 SU	J HT
PTM-08-17-17	EPA 200.7	Lead	0.0028 mg/L	J DL
PTM-09-07-17	2540D	TSS	0.4 mg/L	J DL
PTM-09-07-17	4500H	pH	6.78 SU	J HT
PTM-09-21-17	2540D	TSS	0.4 mg/L	J DL
PTM-09-21-17	4500H	pH	6.73 SU	J HT
PTM-09-21-17	EPA 200.7	Lead	0.0026 mg/L	J DL
QC-08-17-17	2540D	TSS	0.4 mg/L	J DL
QC-08-17-17	4500H	pH	6.85 SU	J HT

TABLE 2
Qualifiers Added During Data Validation
Bunker Hill Central Treatment Plant Upgrade Program
Kellogg, Idaho

SampleIDs	Methods	Analytes	Concentrations	Qualifiers and Reason Codes
QC-08-24-17	4500H	pH	2.91 SU	J HT
QC-09-07-17	2540D	TSS	0.4 mg/L	J DL
QC-09-07-17	4500H	pH	6.82 SU	J HT
QC-09-07-17	EPA 200.7	Lead	0.0029 mg/L	J DL
QC-09-11-17	4500H	pH	3.12 SU	J HT
QC-09-22-17	EPA 200.7	Cadmium	0.0039 mg/L	U MB
QC-09-22-17	4500H	pH	6.94 SU	J HT

Notes:

SU = Standard Units

TSS = Total Suspended Solids

mg/L = milligrams per liter

Qualifier Definitions:

J = The analyte was positively identified; the associated numerical value is approximate.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Reason Codes:

DL = The analyte concentration is between the method detection limit (MDL) and the reporting limit (RL).

HD = High laboratory duplicate RPD

HT = Holding time exceedence

MB = Method blank detection

TABLE 3
Field Duplicate Detections
Bunker Hill Central Treatment Plant Upgrade Program
Kellogg, Idaho

Analyte	Method	Average RL	Primary Concentration	Field Duplicate	RPD	Notes
Samples PTM-08-17-17 and QC-08-17-17						
TSS	2540D	1.0 mg/L	0.6	0.4	40%	± RL
pH	4500H	SU	7.02	6.85	2.5%	
Cadmium	EPA 200.7	0.0020 mg/L	1.22	1.26	3.2%	
Lead	EPA 200.7	0.0075 mg/L	0.0028	0.0026	7.4%	
Zinc	EPA 200.7	0.010 mg/L	9.85	10.1	2.5%	
Samples KT-08-24-17 and QC-08-24-17						
TSS	2540D	5.0 mg/L	27.0	26.0	3.8%	
pH	4500H	SU	2.91	2.91	0.0%	
Cadmium	EPA 200.7	0.0020 mg/L	0.260	0.257	1.2%	
Lead	EPA 200.7	0.0075 mg/L	0.534	0.529	0.9%	
Manganese	EPA 200.7	0.0080 mg/L	36.8	36.3	1.4%	
Zinc	EPA 200.7	0.100 mg/L	120	118	1.7%	
Samples PTM-09-07-17 and QC-09-07-17						
TSS	2540D	1.0 mg/L	0.4	0.4	0.0%	
pH	4500H	SU	6.78	6.82	0.6%	
Cadmium	EPA 200.7	0.0020 mg/L	1.36	1.39	2.2%	
Lead	EPA 200.7	0.0075 mg/L	0.0 U	0.0029	NC	± RL
Zinc	EPA 200.7	0.010 mg/L	10.7	11.1	3.7%	
Samples 006-09-22-17 and QC-09-22-17						
TSS	2540D	1.0 mg/L	0.4 J	1.0	86%	± RL
pH	4500H	SU	7.02 J	6.94 J	1.1%	
Manganese	EPA 200.7	0.0080 mg/L	28.3	28.8	1.8%	
Cadmium	EPA 200.7	0.0020 mg/L	0.0039	0.0039	0.0%	
Zinc	EPA 200.7	0.010 mg/L	0.153	0.155	1.3%	

Notes:

TSS = Total Suspended Solids

Qualifier and Reason Code Definitions:

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

± RL = The difference between analyte concentrations is less than the reporting limit, demonstrating acceptable sampling and/or analytical precision.